



## The effect of exchange rate variability on US shareholder wealth

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### ABSTRACT

We examine the relationship between financial crisis exchange rate variability and equity return volatility for US multinationals. Empirical analysis of the major financial crises of the last decades reveals that stock return variability increases significantly in the aftermath of a crisis, even relative to the increase in stock return volatility for other firms belonging to the same industry and market capitalization class. In conjunction with this increase in total volatility, there is also an increase in stock market risk ( $\beta$ ) for multinational firms. Moreover, trade and service oriented industries appear to be particularly sensitive to these changing exchange rate conditions.

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### 1. Introduction

The simultaneous growth of exchange rate uncertainty and international trade has forced managers as well as investors to pay increasing attention to the impacts of currency movements in firm value. They acknowledge moreover the fact that nowadays exchange rate uncertainty has grown to one of the most important sources of risk companies are facing. Standard economic analysis implies that movements in the exchange rate influence both the current and future expected cash flows of a firm's operation and the discount rate employed to value these cash flows. But in reality, firms' cash-flows are not only affected through relative price changes in input and output products and services but also through the relative values of domestic and foreign assets and liabilities. Exchange rate variability influences moreover the competitive positions of firms both in their domestic and foreign input and output markets.

For the past decade, many researchers have been empirically investigating the foreign exchange risk exposure of multinational firms. Despite multinationals' extensive involvement in international activities and the implication of economic theory, existing literature has met with limited success in identifying significant contemporaneous correlations between exchange rate fluctuations

and US stock returns (see, [Jorion \(1990\)](#) and [Griffin and Stulz \(2001\)](#) for instance). The controversy has stimulated the interest of many researchers in similar issues involving other countries, especially those with market characteristics different from the US stock market while motivated others to explain the difficulty in obtaining stable and significant measures of exchange exposure.<sup>1</sup>

Since the debate regarding the counter-intuitiveness of previously reported results on exchange risk exposure remains, this paper presents an alternative approach to empirically assess the impact of exchange rate changes on firm value. Rather than analyzing the impact of exchange rate movements on firm value by regressing multinationals' stock returns on exchange rate changes, we aim to increase our understanding of the (time-varying) relationship between exchange rates and stock prices by reconsidering the foreign exchange risk exposure puzzle from a different angle. Motivated by [Bartov et al. \(1996\)](#), we concentrate hence in this paper on the impact of increased exchange rate variability on the stock return volatility of US multinationals by focusing on the turmoil periods around the major financial crises of the last decade: Mexico's float of the peso in December 1994, Argentina's financial crisis and its efforts not to devalue the Argentine peso in March 1995,<sup>2</sup> Brazil's decision to let the real float in January 1999, and

<sup>1</sup> See, [Bodnar and Wong \(2003\)](#), [Chue and Cook \(2008\)](#), [Dominguez and Tesar \(2006\)](#), [He and Ng \(1998\)](#) and [Muller and Verschoor \(2007b\)](#) for example.

<sup>2</sup> The analysis of the Argentinean crisis in March 1995 enables us to explicitly verify the presence of a positive currency premium under currency boards if these currency boards are not fully credible anymore.

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the Asian financial crises in Thailand, Malaysia, Indonesia and Korea in July, August and December 1997.<sup>3</sup> More specifically, we analyze the change in US stock market risk ( $\beta$ ) in response to the onset – or fear – of an exchange rate regime shift in countries where these US multinationals are internationally active. Significant contribution of increased exchange rate variability to systematic risk would imply that the cost of equity capital for these firms will increase relative to that of non-multinational (domestic) firms and that the additional risk due to exchange rate uncertainty has a significant impact on their value.

Our results are easily summarized. By using a sample of 673 US multinational firms with real operations in the crisis-contaminated countries, we find that the stock return volatility of US multinational firms increases significantly in the aftermath of a financial crisis, even relative to the increase in stock return volatility for other US firms belonging to the same industry sector and market capitalization class that are not active in the crisis countries. The breakdown between systematic and diversifiable risk shows moreover that the stock market risk ( $\beta$ ) of these US multinationals increases significantly during periods of increased exchange rate uncertainty. Finally, we demonstrate that the wholesale and retail trade, the transportation, communications and utilities as well as the finance and services sectors are particularly sensitive to exchange rate crises uncertainty. Small capitalization firms are likewise exposed to changes in the international trade environment.

The remainder of the paper is organized as follows: after discussion our research design in Section 2, we describe the selected exchange rate crises and the nature of our sample procedures in Section 3. In Section 4, we examine the impact of increased exchange rate variability on US stock return volatility. In Section 5 the estimates of the extent to which US multinationals are exposed to financial crisis exchange rate uncertainty are presented and analyzed. Section 6 closes with some sensitivity analyses across industries and market capitalization classes. The final section concludes our findings.

## 2. Research design

The past decade witnessed a flow of financial crises in developing countries quite unlike those of the preceding decade. The decade of the 1990s opened with many developing countries suffering from a capital inflow “problem”. As suggested by many observers, one major reason explaining this problem was the quasi-US dollar peg adopted by many of these economies. The maintained exchange rate regimes were no longer viable in light of the greatly enhanced integration of these markets with international capital markets. They caused the overvaluation of the currencies (Edwards, 1999) and encouraged excessive foreign currency borrowing through provision of implicit guarantee on exchange rate stability (Eichengreen and Hausman, 1999). Whereas pegged regimes attempt to promote predictability, reduce inflationary expectations, ease trade – by eliminating exchange rate risk – and investment relations, their abandonment causes large financial shocks. When a country faces a financial crisis marked by a significant depreciation of its currency, other countries also suffer from trade spillovers. Empirical studies demonstrate that the rise in the volatility of exchange rates – and the subsequent increase in uncertainty and risk – has significant consequences on trade flows.<sup>4</sup> We expect that the large exchange rate swings in the aftermath of the financial crisis altered the trade terms between the crisis countries and the US and that the increased exchange rate

variability contributed to the uncertainty of the economic and financial environment of US multinationals. The rapid expansion of currency crises to world stock markets, through an increase in the observed volatility of financial markets and capital flows around the world, has led academics and investors to re-evaluate the impact of (increased) exchange rate fluctuations on stock markets.<sup>5</sup>

In this paper, we empirically examine how the changing exchange rate environment and the downturn faced by these emerging economies affected the US economy. As much of this impact is likely to be through trade, we focus on US multinationals entertaining close trading relationships with these turmoil markets. We examine whether the variability of their stock returns were affected by the financial crisis of their trading partners and whether this resulted in a significant increase in their stock market risk ( $\beta$ ). In a first step, we investigate whether the enhanced uncertainty about the future performance of US multinationals active in these turmoil markets resulted into an increased stock return variability. Even if firms that did not entertain trade relationships with the crisis countries may have been indirectly influenced by the economic waves following the crisis, there is no doubt that multinational firms that had real operations in the crisis countries were the first economic actors to be affected. We therefore expect the increase of the stock return variability to be more important for US multinationals that are engaged in foreign sales activities with these turmoil markets than for other US firms. Motivated by Bartov et al. (1996), we hence create a control sample of firms in the same line of business and of similar size (market capitalization) to test for a different impact of the currency crisis on ‘non-crisis oriented’ firms. This enables us further to control for the influence of other confusing forces and for possible confounding factors related to industry or firm size.

The breakdown of the stock return volatility between systematic and unsystematic risk allows us to moreover to evaluate the effects of exchange rate variability on firms’ market  $\beta$ . The second step will answer the crucial question whether – or not – the impact of this increased uncertainty is priced on the market and has direct implications for firms’ cost of capital, their investment choices and hence shareholder value. In a well diversified portfolio only systematic risk, which cannot be diversified away, receives compensation through higher required rates of return. Thus an increase in a firm’s systematic risk with respect to the US equity market portfolio leads to an increase in the required rate of return and an increase in the cost of (equity) capital. To examine empirically the systematic risk ( $\beta$ ) of US companies we use the augmented market model suggested by Jorion (1990). The estimation of this multi-factor model enables us to analyze whether the impact of exchange rate movements on the equity value of these firms rises during periods of increased exchange rate variability and whether increased exchange rate uncertainty influences the sensitivity of US multinational firms to stock market risk ( $\beta$ ). Note that the contribution of exchange rate uncertainty to firm’s sensitivity to market risk can be intuitively motivated by the impact of exchange rate volatility on their trade activities – and hence on their business risk – as well as by the existence of other repercussions to the fundamentals of these firms that are not shared to the same degree by the market as a whole.

As underlined by Bartov et al. (1996), this research design has fundamental advantages compared to the existing literature on exchange rate exposure. First, since variances are estimated over a multi-period window, our analysis does not suffer from the potential temporal instability of the sign of the exposure (Bartov and Bodnar, 1994) and reduces the necessity that the impact of the

<sup>3</sup> Edwards (1999) identifies these countries as being the economies that had been most affected by the Asian currency and financial crisis in 1997.

<sup>4</sup> Rahmatsyah et al. (2002) provide an extensive discussion of this literature.

<sup>5</sup> For example, see Antell and Vaihekoski (2007), Bartram et al. (2007), Bartov et al. (1996), Chen and So (2002), Muller and Verschoor (2007a).

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